Legislative Council Panel on Transport
Subcommittee on Matters Relating to Railways

Hong Kong Section of the Guangzhou-Shenzhen-Hong Kong Express Rail Link

Supplementary Information

In the meeting of the Subcommittee on Matters Relating to Railways of the Legislative Council ("LegCo") Panel on Transport on 5 May 2014, it was highlighted that three contracts – 810A, 823A and 826 – are critical to determining the opening of the Hong Kong Section of the Guangzhou-Shenzhen-Hong Kong Express Rail Link ("XRL") project in 2017 under the revised programme. This paper serves to provide supplementary information to answer members' questions on the three contracts and the related topics raised.

More than 8,500 MTR project team members and contractor staff are focused on pushing forward with the XRL construction works. Their latest progress includes:

- On Contract 810A, B1 slab located at the site of the original Jordan Road stretching east to west was completed last month (i.e. April 2014). With the completed diaphragm wall, adequate support to the north station structures is now in place, allowing the excavation area to be enlarged.
- On Contract 823A, components that need to be replaced or repaired have been removed from the tunnel boring machine (TBM) which was damaged by rain water. Detailed inspection is being carried out as the team awaits the shipment of specialized components from Japan.
- On Contract 826, the two TBMs are making satisfactory progress in the cross-boundary section.

I. Contract 810A - West Kowloon Terminus Station North

Site Investigation

1. Site investigation work at the West Kowloon Terminus ("WKT") work site was carried out in phases between 2008 and 2010. Before and after site possession, the MTR Corporation ("the Corporation") obtained information from over 600 drill holes covering all areas of

the work site, with the exception of the former Jordan Road area. The drill holes used in that process were spaced on average 14.4 metres apart. This is in line with the relevant Government guidelines, and is also closer than the industry norm.

2. On questions regarding the adequacy of site investigation work at the location of the former City Golf Club, it is noted that prior to the Corporation taking possession of the premises, site investigation work was carried out at the pedestrian footpath and car parking areas of the Club. After taking possession, full site investigation work was conducted in the remaining areas of the Club. Some concerns have been noted regarding the volume of granite found within the WKT work site. The Corporation wishes to point out that the approximately 78,000 cubic metres of fresh bedrock that has yet to be excavated in the terminus north area is a known factor based on the site investigation work.

3. Due to the heavy daily volume of traffic using the eight-lane Jordan Road, road closure for site investigation had not been pursued so as not to cause major traffic blockage. The ground condition under Jordan Road was not adequately documented until the road was moved from its original location after construction had started.

4. The excavation work at WKT has been delayed by the longer-than-expected time taken to construct the diaphragm wall near the Jordan Road area. That wall, which is required to maintain ground stability and to protect nearby buildings, must be built deep into the ground around the perimeter of the entire construction site. However, difficult ground conditions, involving the removal of large boulders, corestones and uneven bedrock, caused serious delay in the construction of the diaphragm wall at the approach tunnel section north of the terminus. Design adjustments and re-scheduling of works helped to recover six months of delay on starting that section of the diaphragm wall construction, but, in spite of that, the overall programme for the terminus main structures registered a 11-month delay.

Construction Progress

5. The most critical aspect of the WKT construction works is the northern part of the terminus building near Jordan Road under Contract 810A. The terminus structure in this area will first be constructed using a top-down method, followed by installation of

trackwork, overhead lines and other track-related E&M systems. Testing and commissioning is expected to take place in early 2017.

6. To catch up on the delay linked to challenges in the construction of the diaphragm wall, a Temporary Traffic Management Scheme to divert Jordan Road southwards from its original location was implemented in February 2012 to allow works below the existing Jordan Road to commence six months earlier than would have been otherwise possible.

7. To help expedite the construction programme for works at the north top-down area, the project team adjusted the works design, sequence and construction methods. Originally a top-down construction method was planned to be applied down to B4 level using temporary socketed H-piles, followed by installation of the permanent steel columns from B4 upwards to B1, before constructing rooms and then Electrical & Mechanical ("E&M") works. To speed up the future construction, the steel columns were fully installed from ground level, allowing replacement of the temporary socketed H-piles, and faster construction of the rooms and E&M works as civil works progress top-down.

8. The B1 slab located at the former Jordan Road was fully completed from east to west last month (i.e. April 2014). In combination with the completed diaphragm wall, adequate support to the surrounding infrastructure is now in place to allow excavation below B1 in the north top-down area.

9. The Corporation is now working closely with the contractors to keep to the revised programme by increasing the number of workers, total working hours, and the amount of machinery used in the project. Other measures used to keep the project on schedule have included re-scheduling parts of the project and dividing up major works. For example, construction of the terminus structure will commence as soon as excavation work has been completed in one part of the site. Plans are also in hand to gradually increase the production rate on concrete work to an average 20,000 cubic metres per month.

10. To achieve commencement of passenger service in 2017, the Corporation is closely liaising with contractors and relevant departments to explore other viable measures such as the use of blasting to remove the hard rock and adjust the current temporary road diversions including closing a section of Lin Cheung Road near

the Kowloon Station. These measures are not planned for in the revised programme, but if implemented, will help to accelerate the programme. Formal submissions for both these further enhancements will be made shortly.

11. Testing and commissioning of the railway systems are expected to commence in early 2017. This work can be conducted independent of continuing works at WKT to construct the Lin Cheung Road Underpass, the roof steel structure and the external wall systems of the terminus building plus other related works. The WKT work is expected to be completed in the first half of 2017, i.e. before the commencement of passenger service.

Partial Operation

12. The planning and design of WKT for XRL is based on the long-term needs and strategic planning of the cross boundary traffic. The terminus will house a total of 15 platforms, with 5 initially being reserved for further service expansion. The operation of six platforms at WKT together with the twin track tunnels is adequate to meet the opening service requirement of four trains per hour. It was based on this Day 1 service requirement that the Corporation formulated and proposed the Minimum Operating Requirement ("MOR") concept to Government in 2013.

13. According to the April 2014 revised construction programme, a full trial run of XRL is scheduled to commence in the third quarter of 2017 and ready for passenger service by the end of the same year. According to the estimated passenger flow, 10 platforms will be available for a full 'Day 1' service when the WKT is open for passenger service by the end of 2017.

II. Contract 823A - Yuen Long Tunnel Section

Tunnel Boring Machine

14. As previously reported, the black rainstorm on 30 March 2014 resulted in severe damage to a tunnel boring machine ("TBM") in Contract 823A - Yuen Long Tunnel Section. This exacerbated the difficulties that were already being experienced by the TBM and further affected construction progress even though a second TBM had been deployed in this contract as a measure to recover the time

lost initially due to delayed handover of the site for construction. The challenges faced include frequent mechanical problems with the two TBMs and mixed ground conditions which caused high wear and tear to the machines, both of which resulted in the need for frequent maintenance, repairs and replacement of components. Site constraints also affected the volume of spoil that could be removed from the tunnel. Prior to the rainstorm, the damaged TBM was undergoing repair and maintenance and was originally due to resume operation in April. However, the TBM was submerged by flood waters during the rainstorm and severely damaged. The resumption of the TBM operation work is expected to take nine months due to the need to replace more than 2,000 components before tunnel boring work can recommence.

15. To prevent a reoccurrence of the flooding that damaged the TBM, enhanced mitigation measures have also been implemented including more frequent inspections of slopes in the construction site and stepped-up clearing up of the drainage system. These measures have been successful in protecting the site from flooding during the recent heavy rains.

Construction Progress

16. After assessment by the project team, the contractor and the TBM supplier, it was considered that the most viable solution to resuming tunneling work in this section was to repair the damaged TBM in-situ. As noted earlier, that repair work requires the replacement of more than 2,000 components, most of them electrical and electronic components. Repair and testing work is expected to take nine months, with full tunnel operation resuming in December 2014.

17. After the TBM resumes operation, breakthroughs of the down and up tracks of the 823A north tunnels are targeted for January 2015 and February 2016 respectively. The second TBM on this project is continuing to operate and breakthroughs of the down and up tracks of the south tunnels are scheduled for May 2014 and May 2015 respectively. The testing and commissioning of the whole 823A tunnels section is expected to commence in December 2016.

III. Contract 826 – Cross-Boundary Tunnel Section

Construction Progress

18. After completing the tunnels for the XRL Shenzhen section, two TBMs crossed the boundary in November 2013 and March 2014 respectively to begin tunnel excavation on the Hong Kong section. The arrival of these TBMs was 14.5 months behind schedule.

19. The XRL project team is now focused on boring through the 200 metre high-risk marble zone, an area that is known to have cavities. Since thorough site investigation data cannot be obtained for the wetland preservation area, the project team does not possess detailed information on the exact location, size and depth of the underground cavities. As a safety measure to ensure the TBMs remain on course, probing ahead of the tunnel excavation by drills mounted inside the TBM will be carried out to check for cavities. Should any trace of the presence of cavities be detected, additional time will be taken to carry out grouting to ensure that the cavities are filled before tunnel excavation resumes. As such, a lot more time is required to tunnel through this marble zone.

20. After boring through the marble zone, the TBMs can resume operation at their normal speed. The down and up track TBMs are expected to break through the alignment at Mai Po in February 2015 and May 2015 respectively. Testing and commissioning can then be carried out in February and December 2016.

21. The Corporation will make every effort to complete the Hong Kong Section of the Guangzhou-Shenzhen-Hong Kong Express Rail Link project in accordance with the revised programme to deliver this strategic rail infrastructure for passenger service by the end of 2017.

MTR Corporation
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